

REMARKS

By the present amendment, claims 13-15, 17-19, 24, 29-30, 32-33 and 35-36 have been amended to obviate the examiner's objections thereto and/or to further clarify the concepts of the present invention. In addition, claims 12, 39 and 40 have been cancelled without prejudice or disclaimer and dependent claims 41-43 have been added. Claims 1-11, 13-38 and 41-43 are now in the application. No fees are necessitated by the presentation of additional claims since a corresponding number has been cancelled. Entry of these amendments is respectfully requested.

In the previously mentioned Action, the drawings were found to objectionable. In particular, the following was alleged:

(1) The drawings did not show each and every feature as claimed, that is, the drawings apparently did not show the dissolution unit connected to a preparation tank and the gas collection unit connected to the dissolution unit. In response, inasmuch as this language has been deleted from the claims, it not believed to be necessary to amend the drawings to show these structures.

(2) The drawings do not show reference numeral 1 as mentioned on page of the specification. In response, Figure 1 has been amended herein to include the number "1"

with a lead line to the rectangle formed with a dashed line.

Accordingly, withdrawal of the objection to the drawings is respectfully requested.

Claims 13-31 and 34-38 were rejected under the first paragraph of 35 USC § 112 as failing to comply with the written description requirement, that is, not being supported by the application as filed. In particular, it was alleged that the claims recite that the dissolution unit is connected to the preparation tank and such is not disclosed in the application as filed.

In response, initially it is to be noted that the terms a dissolution unit (22), a gas discharge control unit (23), and a liquid discharge control unit (24) have been amended in the claims to a first valve (35), a second valve (44), and a third valve (46), respectively so as to clarify structural relationships between the units. Since the claims have been amended to no longer specifically recite the dissolution unit, thus there is no necessity to clarify the relationship between the dissolution unit and the tank. Accordingly, withdrawal of the rejection under the second paragraph of 35 U.S.C. § 112 is respectfully requested.

In addition, claims 13-14, 17-19, 24, 29, 32 and 33 were rejected under the second paragraph of 35 USC § 112 as being indefinite and claims 13, 17, 18, 19, 24, 32 and 39 were rejected under the same statute as being incomplete for omitting essential structural

cooperative relationships of elements. In particular, the following was alleged:

(1) Claims 13, 17, 18, 19, 24, 32 and 39 - The claims failed to recite structural cooperative relationships between the (gas) discharge control unit, the liquid discharge control unit and the remaining elements.

In response, it is to be noted that these claims no longer recite either of the (gas) discharge control unit or the liquid discharge control unit.

(2) Claims 13, 17-19 - It was asserted that the claims are confusing in terms of the relationship between the dissolution unit and the liquid discharge control unit.

In response, it is to be noted that these claims no longer recite either of the dissolution unit or the liquid discharge control unit.

(3) Claim 14 - Apparently this claim was interpreted to recite that the dissolution unit includes or incorporates the gas supply unit. In so doing, the specification was cited that indicates that gas cylinder 28 is a separate component from the dissolution unit.

In response, this claim has been amended such that it no longer recites the dissolution unit, but rather the overall solution refinement device.

(4) Claim 14 - The examiner has questioned whether the dissolution unit includes the preparation tank.

In response, this claim has been amended such that it no longer recites the dissolution unit, but rather the overall solution refinement device which includes the preparation tank.

(5) Claim 15 - The examiner has alleged that there is no antecedent basis for the phrase "the gas supply unit" in this claim.

In response, the noted phrase is no longer contained in the claim by the amendments herein.

(6) Claims 17-19 and 24 - It was alleged that the recitation of the dissolution unit and one of the gas discharge control unit and the liquid discharge control unit operate simultaneously is confusing since, if either of the recited units are included in the dissolution unit, the statement has no meaning. In so doing, it was asserted that since the dissolution unit comprises a number of elements, operation of one of these elements would be operation of the dissolution unit.

In response, these claims have been amended such that they no longer recites the dissolution unit nor the gas discharge control unit and the liquid discharge control unit.

7) Claims 33 and 35 - The examiner has asserted that these claims fail to structurally limit the device as their recitations are directed to process limitations. In response, it is to be noted that the suggested proposed amendment to rectify this deficiency for claim 35 as contained in the Office Action has been adopted for both of these claims.

Accordingly, withdrawal of the rejection under the second paragraph of 35 U.S.C. § 112 is respectfully requested.

A series of anticipation and obviousness type rejections of some of the claims 13-40 directed to the solution preparation apparatus were made in the Action. Specifically, these rejections were:

(1) Claims 13-15, 23 and 39 were rejected under 35 USC § 102(b) as being anticipated by the patent to Nakajima et al.

(2) Claims 13-15, 20 and 39 were rejected under 35 USC § 102(b) as being anticipated by the patent to Nelson et al.

(3) Claims 13-16, 20, 23, 29, 34-35 and 37-40 were rejected under 35 USC § 102(b) as being anticipated by the patent to Nurmi et al.

(4) Claims 13-16, 23, 29, 34 and 38-40 were rejected under 35 USC § 102(b) as being anticipated by the patent to Ginsburgh et al.

In addition, claims 29, 34, 37 and 38 were rejected under 35 USC § 103(a) as being unpatentable over the above patent to Nelson et al; claims 21-22 were rejected under 35 USC § 103(a) as being unpatentable over the above patent to Nurmi et al; and claims 20-22, 30-31 and 36 were rejected under 35 USC § 103(a) as being unpatentable over the above patent to Nakajima et al further in view of the '080 Japanese patent publication. Reconsideration of all of these rejections in view of the above claim amendments and the following comments is requested.

Before discussing the rejection in detail, a brief review of the presently claimed invention may be quite instructive. The claimed invention is directed generally to a chemical solution preparation apparatus (1) including a chemical solution refinement device (11), which dissolves a chemical gas into a liquid and prepares a refined chemical solution. As shown in Fig. 2, the chemical solution refinement device (11) includes:

a preparation tank (21) for storing a liquid;

a first pipe (L4) for supplying the chemical gas into the preparation tank;

a first valve (35) arranged in the first pipe for opening and closing the first pipe;

a second valve (44) for discharging the chemical gas that was not dissolved in the liquid during the gas dissolving from the preparation tank;

a third valve (46) for discharging a predetermined amount of the chemical solution from the preparation tank; and

a controller (31) for operating the first, second and third valves.

When the controller operates the first valve to supply the chemical gas to the preparation tank, the controller operates the second valve and the third valve to discharge an adjusted amount of the undissolved chemical gas and a predetermined amount of the chemical solution that is under preparation from the preparation tank. By continuously discharging a predetermined amount of the chemical solution and undissolved chemical gas from the preparation tank during dissolving, impurities can be efficiently eliminated from the preparation tank and chemical solution essentially free of impurities can be prepared.

It is submitted that none of the cited patents teach or suggest, among other things, an important technical feature of the claimed invention of controlling first, second, and third valves to discharging a predetermined amount of chemical solution that is under preparation from a preparation tank so as to prepare an essentially impurity-free chemical

solution. It is therefore submitted that the claims directed to the above as amended herein patentably distinguish over the cited patent publications whether taken singly or in combination.

More particularly, the Nakajima et al patent discloses circulating a liquid chemical during preparing the liquid chemical. However, the Nakajima et al patent does not suggest, among other things, discharging or disposing of a predetermined amount of the liquid chemical during preparing the liquid chemical so as to eliminate impurities from the liquid chemical.

The Nelson patent discloses a system 1 including a fixed orifice 28 for limiting the flow of ozonated water through an ozone concentration sensor 27. However, the Nelson patent does not disclose, among other things, a controller for operating the fixed orifice 28 to continuously discharge or disposing of ozonated water from the vessel 2 during preparing the ozonated water so as to eliminate impurities from the vessel 2.

It is to be particularly noted the opening degree of the fixed orifice 28 according to the Nelson patent is not changeable. Accordingly, even if ozone concentration of the ozonated water reaches a desired level, the ozonated water having a desired concentration will be continuously wasted through the orifice 28.



In addition, it is an object of the Nelson patent increase the quantity of ozone gas dissolved in ultrapure water, not to eliminate impurities from refined chemical solution. In order to preparing ozonated water, impurities must not be introduced into the vessel 2. In other words, the vessel 2 must not store impurities when preparing ozonated water. Otherwise, ozone gas will be rapidly decomposed and it is impossible to prepare ozonated water in the vessel 2. Because no impurities are stored in the vessel 2, the Nelson patent does not suggest discharging a predetermined amount of ozonated water during preparing the ozonated water so as to eliminate impurities from the vessel.

The Nurmi patent discloses a manual valve V6 for discharging liquid from a vessel 106. As described on col. 6, lines 36-45, the manual valve V6 is opened when the vessel 106 is to be serviced. Among other things, the Nurmi patent does not teach or suggest controlling the manual valve V6 opened to continuously discharge or dispose of a liquid chemical from the vessel 106 during preparing the liquid chemical so as to prepare an impurity-free liquid chemical.

The Ginsburgh patent discloses saturating a liquid fuel with carbon dioxide gas to prepare a safety-enhanced combustion fuel. However, the Ginsburgh patent does not teach or suggest, among other things, continuously discharging or disposing of the liquid fuel during the gas-saturating operation so as to eliminate impurities from a mixing receptacle 20.

The Sakamoto Naoki Japanese patent publication discloses bubbling gas in a liquid. However, the publication does not teach or suggest continuously discharging or disposing of the liquid during gas-bubbling operation so as to eliminate impurities from the liquid.

In summary, it is submitted that the subject claims distinguish over the above cited patents in that, among other things, the recited apparatus includes a controller (31) for operating the first (35), second (44) and third (46) valves. When the controller operates the first valve to supply the chemical gas to the preparation tank, the controller operates the second valve and the third valve to discharge an adjusted amount of the undissolved chemical gas and a predetermined amount of the chemical solution that is under preparation from the preparation tank. By continuously discharging a predetermined amount of the chemical solution and undissolved chemical gas from the preparation tank during dissolving, impurities can be efficiently eliminated from the preparation tank and chemical solution essentially free of impurities can be prepared.

For the reasons stated above, withdrawal of the rejections under 35 U.S.C. § 103 and § 103 (a) and allowance of claims 13-39 and 41-43 over the cited patent publications are respectfully requested.

Although not specifically indicated, it is noted that claims 17-19, 24-28, 32, 33 and 40 were not rejected over the cited art.

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In view of the foregoing detailed discussion and the amendments herein, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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